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BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMI--ETC F/G 12/1  
NUMERICAL METHODS AND APPROXIMATION AND MODELLING PROBLEMS IN S--ETC(U)  
AUG 81 H J KUSHNER, W H FLEMING AFOSR-76-3063

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FINAL REPORT

NUMERICAL METHODS AND APPROXIMATION AND MODELLING

PROBLEMS IN STOCHASTIC CONTROL THEORY

Contract [REDACTED] AFOSR-AF-76-3063

July 1, 1980 - June 30, 1981

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

Brown University  
Lefschetz Center for Dynamical Systems  
Division of Applied Mathematics  
Providence, R. I. 02912

Principal Investigators:

Wendell H. Fleming  
Harold J. Kushner

August 20, 1981

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SUMMARY OF SCIENTIFIC PROGRESS, July 1980 - June 1981

Papers by H.J. Kushner

Diffusion approximations for non-linear phase-locked loop type systems with wide band inputs.

Stochastic approximations with discontinuous dynamics and state dependent noise, w.p.1 and weak convergence.

An averaging method for stochastic approximations with discontinuous dynamics.

A cautionary note on the use of singular perturbations.

Convergence and rate of convergence of a recursive identification and adaptive control method which uses truncated estimators.

Asymptotic distributions of solutions of ordinary differential equations with wide band noise inputs; approximate invariant measures.

The above papers deal with a wide variety of methods and examples in the modelling, analysis and approximation of systems with wide band noise inputs, recursive stochastic procedures and adaptive control problems.

Invited Lectures by H.J. Kushner

Conference on Stochastic Systems, September, 1980, Budapest;  
IFID Conference on Recent Advances in Filtering and Optimization, Feb. 1982, Mexico;  
Conference on Decision and Control, December 1981;  
Joint Automatic Control Conference, August, 1980;  
International Symposium on Information Theory, January, 1981.

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MATTHEW J. KERPER  
Chief, Technical Information Division

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Summary - continued

Papers by W.H. Fleming

Optimal exit probabilities and differential games, in Applied Math. and Optimization (1981).

Optimal control for partially observed diffusions, SIAM J. on Control and Optimization (1981).

Nonlinear semigroup for controlled partially observed diffusions, SIAM J. on Control and Optimization (1981).

Stochastic calculus of variations and mechanics, J. Optimization Theory and Applications (special issue dedicated to L. Cesari, 1982).

Optimal control and pathwise nonlinear filtering for nondegenerate diffusions, Proc. 20th IEEE Conference on Decision and Control, Dec. 1981. A more detailed paper on this topic is in preparation.

Optimal control of stochastic integral equations and Hamilton-Jacobi-Bellman equations, Proc. 20th IEEE Conf. on Decision and Control, Dec. 1981.

Stochastic control problem for reflected diffusions in convex bounded domain, Proc. IFIP Working Conference on Recent Advances in Filtering and Optimization, Cocoyoc, Mexico (1982).

Invited Lectures by W. H. Fleming

Summer 1980, American Math. Society meeting;  
IFIP Working Conference on Stochastic Differential Systems (Hungary), Sept. 1980;  
Semester on Mathematical Theory of Optimal Control (Poland), Sept. 1980;  
University of Oklahoma (Karcher Lecture), Nov. 1980.  
INRIA International Conference on Analysis and Optimization of Systems (France) Dec. 1980;  
University of Maryland (College Park and Baltimore Co.), March 1981;  
Courant Institute of Math. Sciences, April 1981;  
Bell Labs, Holmdel, April 1981;  
Math. Research Center, Univ. of Wisconsin, April 1981;  
IEEE Conf. on Decision and Control, Dec. 1981;  
IFIP Working Conference on Recent Advances in Filtering and Optimization, Feb. 1982 (Fleming chairs the International Program Committee).

1 REPORT DOCUMENTATION PAGE		2 GOVT ACCESSION NO		3 RECIPIENT'S CATALOG NUMBER	
18 AFOSR/TR- 81 - 0672		ADA105490		9	
6 TITLE (and Subtitle)		5 PERFORMING ORG. REPORT NUMBER		7 CONTRACT OR GRANT NUMBER(s)	
Numerical Methods of Approximation and Modelling Problems in Stochastic Control Theory,		Final Report 7/1/80 - 6/30/81		AFOSR-76-3063	
7 AUTHOR(s)		10 PROGRAM ELEMENT PROJECT, TASK AREA & WORK UNIT NUMBERS		12 REPORT DATE	
Report prepared by: Harold J. Kushner Wentzell H. Fleming		PE0102E 2304 A4		August 1981	
9 PERFORMING ORGANIZATION NAME AND ADDRESS		11 CONTROLLING OFFICE NAME AND ADDRESS		13 NUMBER OF PAGES	
Lefschetz Center for Dynamical Systems Division of Applied Mathematics Brown University Providence, R.I. 02912		Mathematical & Information Sciences Directorate AIR FORCE OFFICE OF SCIENTIFIC RESEARCH Bolling Air Force Base, Bldg. 410 Washington, D.C. 20332		3	
14 MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15 SECURITY CLASS (of this report)		15a DECLASSIFICATION/DOWNGRADING SCHEDULE	
(12) 4		Unclassified			
16 DISTRIBUTION STATEMENT (of this Report)					
Approved for public release; distribution unlimited.					
17 DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)					
18 SUPPLEMENTARY NOTES					
19 KEY WORDS (Continue on reverse side if necessary and identify by block number)					
20 ABSTRACT (Continue on reverse side if necessary and identify by block number)					
This report summarizes the results of research produced under this grant, and lists titles of papers produced.					

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